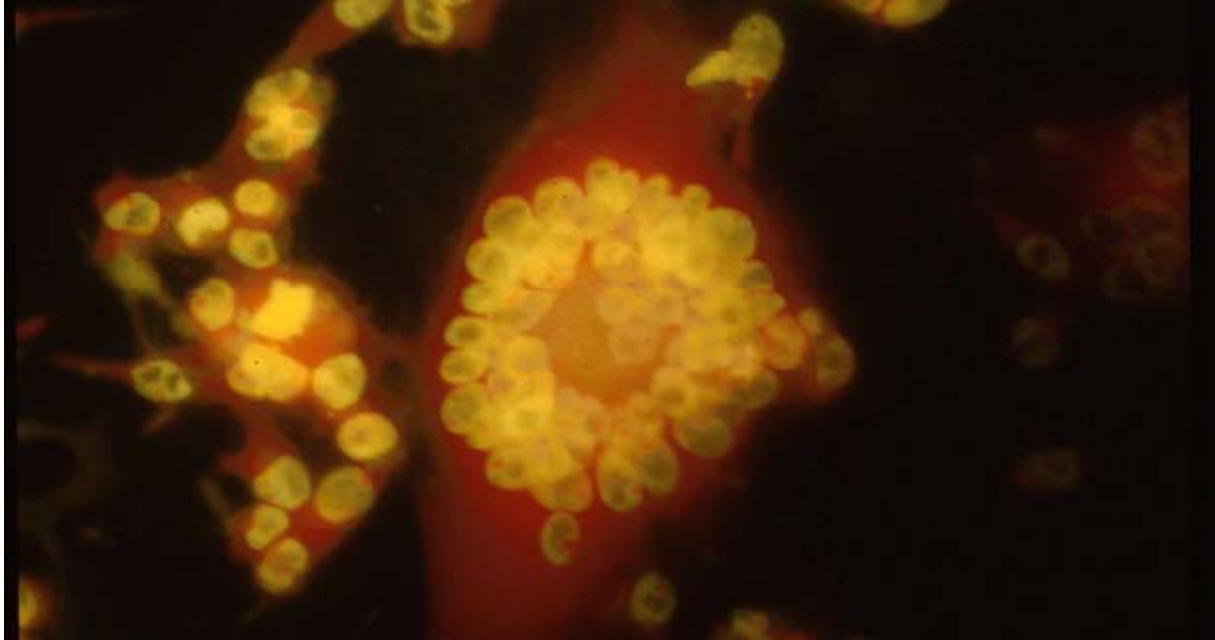




technology opportunity

Rapid Detection of Shingles (Varicella Zoster Virus- VZV)

Point-of-care diagnostic device detects within an hour



The National Aeronautics and Space Administration (NASA) seeks interested parties for the commercial application of the VZV virus detection kit for the rapid detection of the herpes zoster (shingles) virus. Currently, approximately 1 million people per year in the US are diagnosed with shingles based on clinical observation. NASA and University of Colorado scientists were the first to detect VZV DNA in saliva of astronauts during spaceflight and later in shingles patients. Based on this new discovery, a virus detection kit for use with saliva is in development at NASA. This point-of-care diagnostic device is rapid, simple to use, does not require expensive lab equipment, and detects the VZV virus in less than one hour in a physician's office. This is a platform technology that can be used to detect other viruses.

www.nasa.gov

Benefits

- **Point-of-Care Testing:** A testing diagnostic device for use in a physician's office
- **Rapid Results:** Detects virus in less than one hour
- **Simple and Non-Invasive:** Diagnosis is performed by testing a saliva specimen
- **Disposable:** Tests can be performed in a contained system; biological waste is contained for fast and efficient disposal

Applications

- Physicians Office
- Hospitals
- Testing
- Research

Commercial Opportunity

- ☒ Patent Pending
- ☐ U.S. Patent(s)
- ☐ Copyrighted
- ☒ Available to License
- ☐ Available for No-Cost Transfer
- ☒ Seeking Industry Partner for Co-Development

For More Information

If you would like more information or want to pursue transfer of this technology please contact us at:



Technology Transfer &
Commercialization Office
NASA Johnson
Space Center

Phone: 281-483-3809
E-mail: jsc-techtran@mail.nasa.gov
Web: <http://technology.jsc.nasa.gov>

Background

Market

There are an estimated 1 million cases of shingle each year in the US and almost half of the cases occur in adults after the age of 60. In a subset of these patients, the virus causes acute to chronic pain and multiple severe disorders such as meningitis, multiple cranial nerve palsies, blindness, etc.



Existing Technology

Current diagnostic tests for the VZV virus include the Polymerase Chain Reaction (PCR) assay or the immunofluorescent tests. These tests require blood, spinal or blister fluid that is obtained using invasive methods and costs hundreds of dollars. The fluid sample is normally sent out to a reference lab unless the clinic has the expensive test equipment and trained personnel available to analyze the test sample, where results are obtained within days. In the meantime the disease is rapidly progressing unless anti-viral drugs were prescribed by the physician. Other methods include taking samples from wounds and examining them under a microscope. These methods are not overly successful since VZV and herpes simplex virus (HSV) cells have similar appearance, and both of these procedures are invasive and painful.

Technology Details

How it Works

The saliva sample is collected and added to an antibody attached to micromagnetic beads. A chemical solution containing the antibody and horseradish peroxidase (HRP) is added to the mix. A solution of luminol is washed through the device and as it reacts with the HRP, light is emitted to indicate the VZV presence.

A clinical study of 54 patients was conducted to establish the presence of the shingles virus in saliva with current

diagnostic methods. Research was performed to select the most appropriate antibody for this VZV detection kit. The next step is to develop a prototype and perform a blind test study with the appropriate antibody to demonstrate the efficacy of this innovation in a patient population.

Why it is Better

The VZV Detection Kit can be inexpensive, disposable, and fully contained. It detects the virus in less than 60 minutes in a doctor's office performed by their staff. The kit allows for early diagnosis and treatment of the VZV virus which in turn allows patients to avoid progressively, worsening pain and possibly an acute rash and blisters. A percentage of shingles patients can also avoid much higher treatment costs and more severe pain caused by damage to the nerves from the virus. For some patients, the virus causes nerve damage that could worsen if anti-viral treatment is not given to the patient. In some instances, the nerve damage is so severe that the patient continues to have extreme pain years after elimination of the virus. This method would also eliminate the frequently painful practice of examining the wounds to find evidence of the virus, creating a more patient-friendly environment when testing for the virus in possibly infected individuals.

Patents

A provisional application was filed August 2008; an international patent application was filed in August 2009; and a non-provisional application was filed February 2011 for this technology. A joint ownership agreement is in place between University of Colorado and NASA.

Licensing and Partnering Opportunities

This technology is part of NASA's Innovative Partnerships Office (IPO), which seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry. NASA invites companies to consider licensing MSC-24451-1 and MSC-24451-PCT for commercial applications.